天实精工
TSP

双摄+1DTOF测距 模块评估

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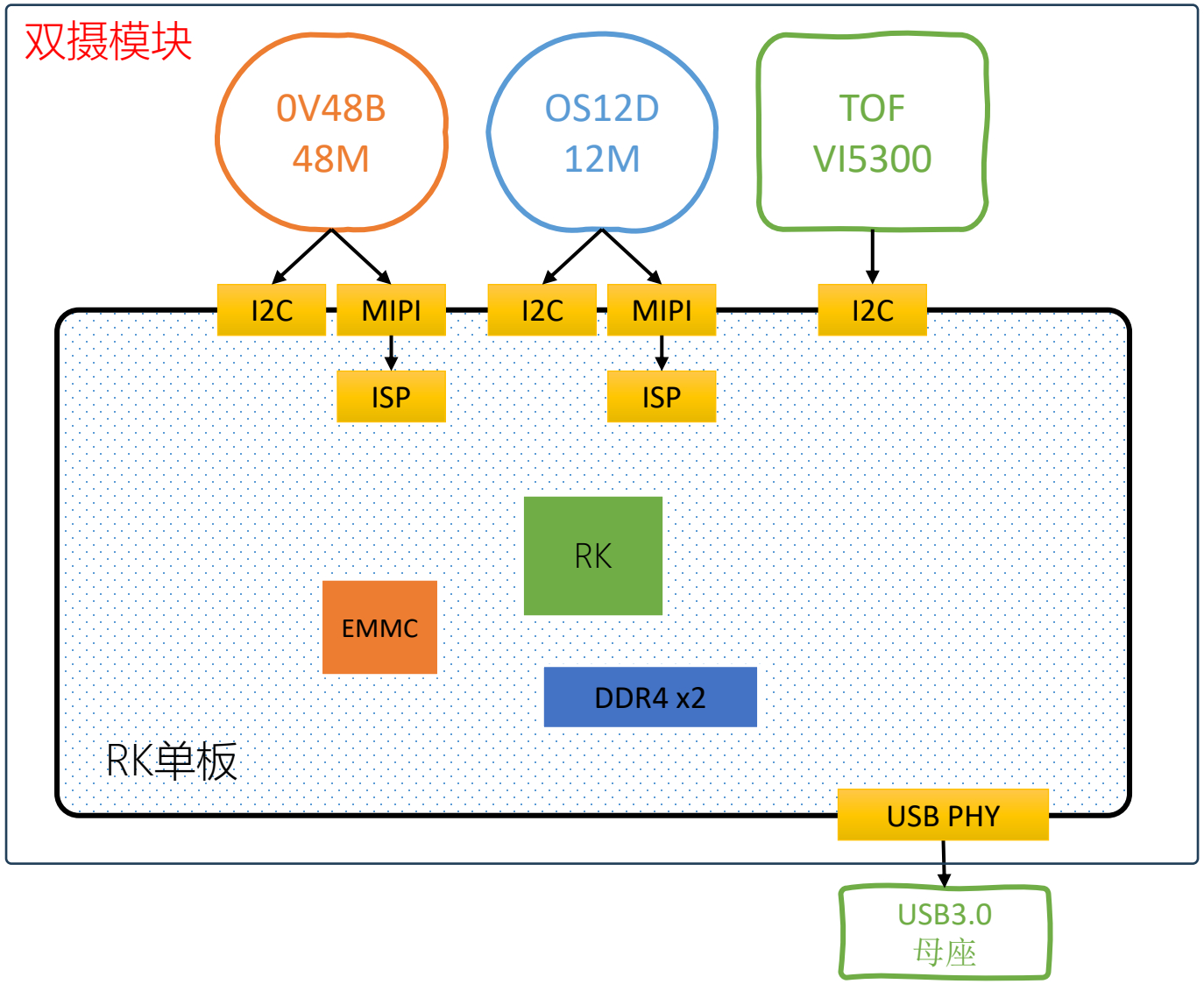
模块框架推荐



说明

1，RGB camera+夜视camera +TOF都集成在一款主控板，

2，主控板通过USB与上位机通讯，

3，TOF提供实时物方与飞机的距离，

4，整个模块提供AF对焦拍摄录像出图以及图像优化功能。

Camera云台配置

RGB camera sensor

features

- automatic black level calibration (ABLC)
- programmable controls for frame rate, mirror and flip, binning, cropping, and windowing
- support for dynamic DPC cancellation
- supports output formats: 10-bit RGB 4C pattern
- supports horizontal and vertical subsampling
- supports typical images sizes: 8000x6000, 4000x3000, 3840x2160, 1920x1080, and 1280x720
- standard serial SCCB interface
- up to 4-lane MIPI TX interface with speed up to 2.35 Gbps/lane
- 2/3 trio CPHY interface, up to 1.45 Gsps/trio
- embedded 16k bits of one-time programmable (OTP) memory (4k bits reserved for customer use)
- supports 2x2 ML PD
- 4-cell support:
  - 4-cell binning
  - 4-cell full
- on-chip 4-cell to Bayer converter
- three on-chip phase lock loops (PLLs)
- programmable I/O drive capability
- built-in temperature sensor
- typical module size: 9.5 x 9.5 x 5.9 mm

key specifications (typical)

- **active array size:** 8032 x 6032
- **power supply:**
  - core: 1.15V
  - analog: 2.8V
  - I/O: 1.8V
- **power requirements:**
  - active: 572 mW (48 MP @ 15 fps)
  - standby: <10 µA
- **temperature range:**
  - operating: -30°C to 85°C junction temperature (see table 7-2)
  - stable image: 0°C to 60°C junction temperature (see table 7-2)
- **output formats:** 10-bit RGB RAW
- **input clock frequency:** 6~27 MHz
- **lens size:** 1/2"
- **lens chief ray angle:** 34.9° non-linear (see table 9-3)
- **maximum image transfer rate:**
  - 8000x6000: 15 fps (see table 2-1)
  - 12 MP 4-cell binning: 30 fps (see table 2-1)
  - 4K2K: 60 fps (see table 2-1)
  - 1080p: 240 fps (see table 2-1)
- **maximum exposure:** VTS - 22 lines
- **minimum exposure:** 4 rows
- **sensitivity:** 2000 e⁻/Lux-sec
- **max S/N ratio:** 34.1 dB
- **dynamic range:** 69.5 dB @ 16x gain
- **scan mode:** progressive
- **pixel size:** 0.801 µm x 0.801 µm
- **image area:** 6433.632 µm x 4831.632 µm
- **die dimensions:** 7540 µm x 5440 µm (COB), 7590 µm x 5490 µm (RW) (see section 8)

OV48B 48M，可12M输出
同时支持1080P等像素输出

夜视sensor

features

- automatic black level calibration (ABLC)
- programmable controls for frame rate, mirror and flip, binning, cropping, and windowing
- support for dynamic defect pixel cancellation (DPC)
- supports output formats: 10-bit RGB 4-cell pattern Bayer RAW
- supports horizontal and vertical subsampling
- supports typical images sizes: 4512x2512, 3840x2160, 2256x1256, 1920x1080, and 1280x720
- standard serial SCCB interface
- up to 4-lane MIPI TX interface with speed up to 2.5 Gbps/lane
- embedded 8k bits of one-time programmable (OTP) memory (4k bits reserved for customer use)
- 2/3 trio C-PHY interface, up to 1.6 Gsps/trio
- 4-cell support:
  - 4-cell binning
  - 4-cell full
- on-chip 4-cell to Bayer converter
- three on-chip phase lock loops (PLLs)
- sequential multi-frame HDR
- 2.8 MP 10-bit 3-exposure 4C HDR output after tone mapping
- programmable I/O drive capability
- built-in temperature sensor
- typical module size: 8.5 x 8.5 x ~5.1 mm

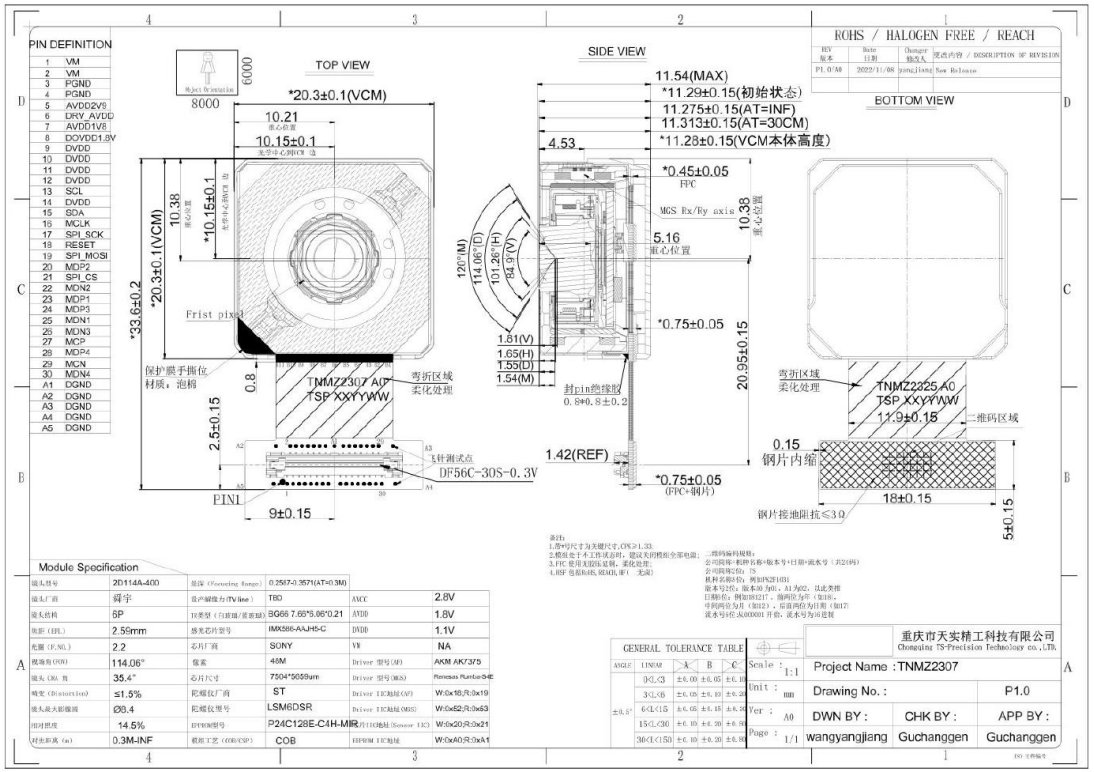
key specifications (typical)

- **active array size:** 4512x2512
- **power supply:**
  - core: 1.1V
  - analog: 2.8V
  - I/O: 1.8V
- **power requirements:** (see sidebar note)
  - active: 505 mW
  - XSHUTDN: <10 µW
- **temperature range:**
  - operating: -30°C to 85°C junction temperature (see table 7-2)
  - stable image: 0°C to 60°C junction temperature (see table 7-2)
- **output formats:** 10-bit RGB 4-cell pattern Bayer RAW
- **input clock frequency:** 12~64 MHz
- **lens size:** 1/2.49"
- **lens chief ray angle:** 8.7° linear (see table 9-3)
- **maximum image transfer rate:**
  - 4512x2512: 60 fps (see table 2-1)
- **maximum exposure:** VTS - 16 lines
- **minimum exposure:** 8 lines
- **sensitivity:** TBD
- **max S/N ratio:** TBD
- **dynamic range:** TBD
- **scan mode:** progressive
- **pixel size:** 1.404 µm x 1.404 µm
- **image area:** 6365.736 µm x 3554.928 µm
- **package dimensions:** 10740 µm x 10335 µm

OS12D，12M输出
同时支持1080P等像素输出
此芯片采用OV夜莺技术BGRG拜耳

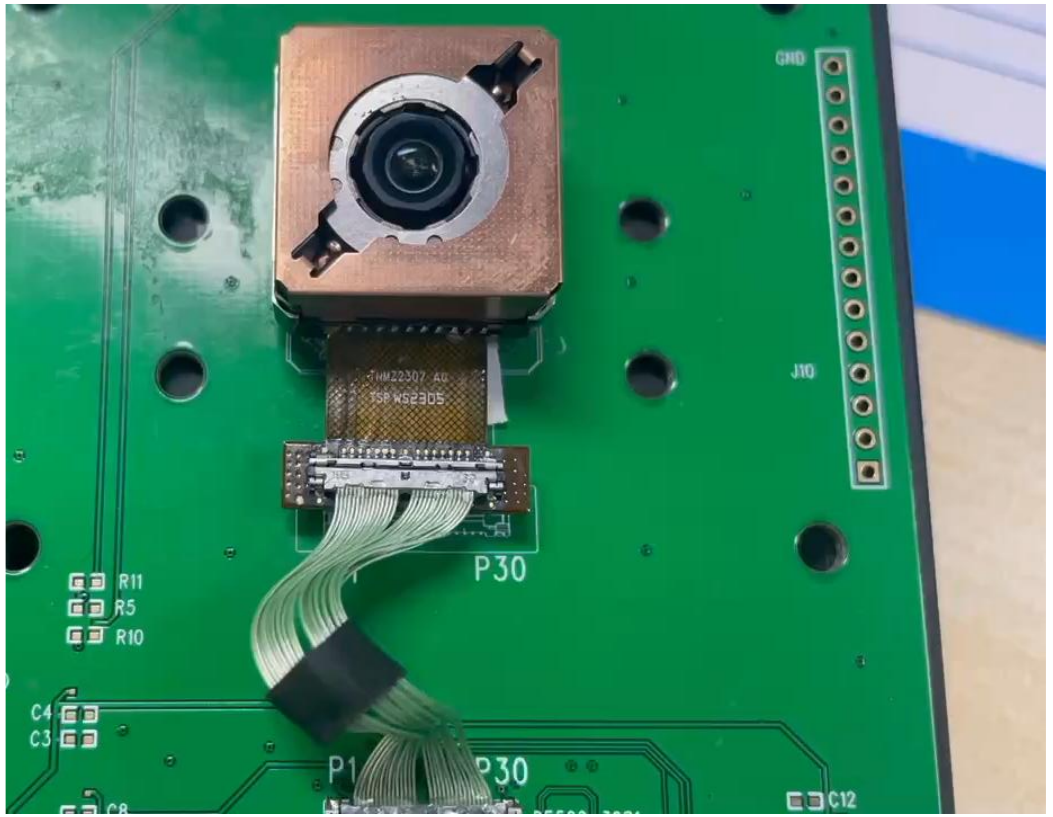
Camera云台配置

云台模组初版图纸

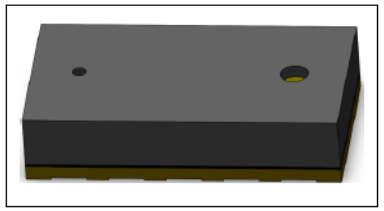


云台模组
1，yaw pitch±5°
2，roll±8°
3，自带AF自动对焦功能（此项功能需要新开马达载体模具）

云台模组初版实物



TOF测距模块



特点

- 全集成系统级封装模块
  - 尺寸：4.4 mm × 2.4 mm × 0.975 mm
  - 940 nm VCSEL 激光发射器
- 测距方法
  - 直接飞行时间测量
  - 直方图算法
  - 参考 SPAD
- 测距特性
  - 距离：最大 4 m
  - 测距频率：最大 90 Hz
  - 测量精度：±4%
  - 距离与置信度反馈
- 光学特性
  - 1 类激光产品
- 片上补偿
  - 环境光抑制
  - 玻璃罩校准
  - 玻璃罩污渍动态补偿
- 易于集成
  - 单电源供电
  - 系统级封装设计
  - I²C 通信接口

应用

- 激光检测自动对焦（LDAF）
- 接近感应
- 避障与防撞
- 1D 手势识别
- 低功耗系统运行时的物体检测

产品概述

VI5300 直接飞行时间（dToF）传感器采用单模块封装设计，集成了单光子雪崩二极管（SPAD）接收阵列以及 VCSEL 激光发射器。该传感器可对物体进行精确的距离测量而不受物体颜色、反射率和纹理的影响，为市场上的微型 ToF 传感提供了紧凑的解决方案。利用自主研发的 SPAD 和独特的 ToF 采集与处理技术，VI5300 可实现最大 4 米的精确距离测量，快速测距频率可达 90 Hz。

该传感器内置了基于直方图的算法，能够对玻璃罩进行校准并补偿污渍或污染物，从而实现稳定可靠的运行。其采用了亚纳秒光脉冲和特殊的人眼安全控制电路，符合 1 类人眼安全标准的要求。该传感器通过窄带滤光片和内置的阳光抑制算法将环境光噪声降到最低，可用于室外阳光环境下的距离测量。测量数据及系统配置信息通过 I^2C 快速模式通信接口进行传输。该传感器易于系统集成，使用单电源供电，且不需要额外的光学元件。

测距模块
1，测距最大4M范围；
2，测量精度4%；
3，通过IIC通讯；
4，测距FOV25°

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谢谢您的聆听

重庆市天实精工科技有限公司

Chongqing TS-Precision CO.,LTD.

以客户为中心，拥抱技术革新，长期艰苦奋斗

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